Methods and data processing report for bulk flux determinations from neutrally buoyant sediment trap (NBST) deployments during EXPORTSNP

Instrument name: Neutrally buoyant sediment trap (NBST)

Model	S/N	Purchase date
SOLO-NBST	NBST-020	N/A
SOLO-NBST	NBST-200	2014
APEX-NBST	NBST-302	2018
APEX-NBST	NBST-303	2018
APEX-NBST	NBST-304	2018
APEX-NBST	NBST-305	2018

Table 1. NBST models, serial numbers, and dates of purchase.

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Document Version 1.2, October 10, 2019

I. Introduction

Neutrally buoyant sediment traps (NBST) are used to directly collect sinking particles at discrete, sub-mixed layer depths (Valdes and Price, 2000; Estapa et al., *in review*). Each NBST carried four cylindrical sediment trap tubes, each with a collection area of 0.0113 m^2, and an upward-facing beam transmissometer (c-Rover 2000, Sea-Bird Scientific) arranged around a central profiling float. NBST-020 and NBST-200 were of an older design constructed around modified Sounding Oceanographic Lagrangian Observer profiling floats with customized controllers and top cap assemblies (built at Woods Hole Oceanographic Institution). The remaining NBSTs were constructed around the APEX float platform (Teledyne Webb Research) (Table 1). The NBSTs are programmed to descend to a predetermined depth, drift while collecting settling particles until a burn wire mechanism closes the trap tube lids, and then ascend to the surface at a programmed time for recovery.

Collected particles were analyzed for particulate carbon (PC), particulate inorganic carbon (PIC), particulate nitrogen (PN), particulate phosphorus (P), particulate barium (Ba), biogenic silica (bSi), mass, and ^{234}Th. Particulate organic carbon (POC) is determined as the difference

between PC and PIC. Fluxes are determined by normalizing to the trap collection area and length of deployment. Bulk compositional analysis does not discriminate among sinking particles from different export pathways (single cells, aggregates, zooplankton products), so this method provides an estimate of the sum of all “sinking particle” pathways.

II. Deployment / Sample collection

A. Deployment

A goal of the EXPORTS field campaigns is to characterize export over operationally-defined time periods, termed “epochs”, equivalent to the time necessary for sinking particles to exit the euphotic zone and enter sediment traps in the upper 500 m. The sample collection and analysis procedures described below were repeated during three 8-day epochs.

Prior to deployment, two sediment trap tubes on each NBST were filled with filtered surface seawater. 500 mL of formalin-poisoned brine (70 ppt) was then gravity-fed through tubing, forming a layer below the filtered seawater to preserve settling particulate matter for bulk flux analysis. The third tube was prepared with polyacrylamide gel to collect samples for imagery and the fourth tube was prepared with RNA*later* preservative to collect samples for sequencing.

NBSTs were programmed to descend to a single measurement depth (95, 145, 195, or 330 m ±25 m), sample for ~5 days until a burn wire mechanism closed the tube lids, and then ascend to the surface for recovery. NBSTs were deployed with an additional ~50 g weight attached with a dissolvable release to aid in initial descent. The release dissolves in ~20 minutes and the weight separates from the package.

Epoch 3, NBST-302 (195 m) and NBST-303 (145 m): Upon resurfacing, the NBSTs failed to download recovery mission instructions and descended for a second ~5-day cycle after a short time at the surface. The trap tube lids closed as planned before resurfacing from the first ~5-day cycle, and lids remained closed during the second cycle. NBST-302 and NBST-303 were recovered after the second cycle and samples were processed at sea by personnel on *R/V Sally Ride* because *R/V Revelle* was no longer in the vicinity (see relevant text in section 3.B, Sample preparation).

B. Sample preparation

Upon recovery, brine tubes were allowed to settle for at least 1 h in the laboratory. The overlying seawater layer was vacuumed out of the tops of the tubes. The remaining brine layers from the two tubes were drained through a single acid-cleaned, 335-µm nylon mesh screen and combined into a 4-L bottle. The screen was picked clean of zooplankton under a dissecting

microscope, and the remaining screen contents were rinsed back into the 4-L bottle with filtered seawater. The combined trap samples were split into eight fractions using a custom rotary splitter.

A, B, and C splits (QMA filters): Three of the eight wet splits (termed A, B, and C) were filtered onto pre-combusted QMA quartz microfiber filters (Whatman) and dried at 45 ± 5°C using a laboratory oven. QMA filters were mounted and immediately counted for low-level β emission onboard the ship. Second counts were obtained for a subset of samples while still onboard the ship. Filters were stored dry at room temperature until analysis on shore for additional ^{234}Th counts and final background β emission. After β counting was complete, samples were unmounted and PC, PIC, and PN were determined. Some QMA filters were also analyzed for Pb/Po at the Autonomous University of Barcelona and for Ba and P via ICP-MS at WHOI.

D, E, and F splits (polycarbonate filters): Three wet splits (termed D, E, and F) were filtered onto pre-weighed, 25-mm diameter, 0.2-µm pore size polycarbonate membrane filters (Nuclepore) and rinsed with pH 8.5 borate-buffered Milli-Q water. All were dried as described above and stored at room temperature until analysis on shore for mass and bSi.

G and H splits: The remaining two ⅛ wet splits (termed G and H) were shared with collaborators.

Epoch 3, NBST-302 and NBST-303 processed on *R/V Sally Ride*: Upon recovery, brine tubes were allowed to settle for at least 1 h in the laboratory. The overlying seawater layer was vacuumed out of the tops of the tubes. The remaining brine layer from a single tube was drained through an acid-cleaned, 335-µm nylon mesh screen. The screen was picked clean of zooplankton under a dissecting microscope, and the remaining screen contents were rinsed back into the >335-µm fraction. The >335-µm and <335-µm fraction from each tube was filtered onto separate Ag filters. Filter A contains the >335-µm fraction and filter B contains the <335-µm fraction from the first brine tube on the NBST. Filter C contains the >335-µm fraction and filter D contains the <335-µm fraction from the second brine tube on the NBST. Filters were dried at 45 ± 5°C, mounted, and immediately counted for low-level β emission onboard the ship. Filters were stored dry at room temperature until analysis on shore for additional ^{234}Th counts, and final background β emission. After β counting was complete, samples were unmounted and PC, PIC, bSi, and PN were determined.

C. Sample analysis

A splits (QMA filters): ^{234}Th analysis was conducted onboard the ship (see section 3.B). On shore, filters were gravimetrically subdivided with one half of each filter reserved for Pb/Po analysis at the Autonomous University of Barcelona. The remaining half filter was again divided in half. One ¼ section was analyzed for PC and PN after high-temperature combustion on a

Thermo Electron FlashEA 1112 C/N analyzer at the WHOI Nutrient Analytical Facility. The remaining ¼ section was analyzed for PIC via coulometry after acidifying with 2 ml of 1N phosphoric acid (Table 2).

B and C splits (QMA filters): ^{234}Th analysis was conducted onboard the ship (see section 3.B). Final background counts to measure non-^{234}Th related β emissions were obtained at WHOI after six ^{234}Th half-lives had elapsed. At this point, QMA filters were unmounted, re-dried, and gravimetrically subdivided. For each trap, either split B or split C was chosen for Ba and P analysis based on the distribution of large particles on the filter surface in an effort to ensure that filter subsections are representative of the bulk sample. For splits on which Ba and P analysis was performed, filters were divided into three equal sections. Splits that did not receive Ba and P analysis were divided into two equal sections (Table 2).

Filter subsections for Ba and P analysis were leached with 0.6 M hydrochloric acid at 60°C for ~16 hours (Bishop and Wood, 2008; Bishop et al., 2012). Leachates were diluted with 2% nitric acid, doped to an indium concentration of ~1 ng/mL, and analyzed for multi-element concentrations using a Thermo Scientific iCAP quadrupole inductively-coupled plasma mass spectrometer (ICP-MS) situated at the WHOI Plasma Facility. Quantification of Ba and P was achieved via comparison of sample ion beam intensities to those of reference solutions with known concentrations. Samples containing sufficient material for Ba-isotopic analysis were aliquoted, spiked with a ^{135}Ba-^{136}Ba double spike, and Ba purified from the sample matrix using two passes of ion-exchange chromatography. Analyses were performed using a ThermoFisher Neptune multi-collector ICP-MS, also situated at the WHOI Plasma Facility.

One section per filter (⅓ if Ba and P analysis was performed, ½ if Ba and P analysis was not performed) was analyzed for PC and PN after high-temperature combustion on a Thermo Electron FlashEA 1112 C/N analyzer at the WHOI Nutrient Analytical Facility. The remaining filter section was analyzed for PIC via coulometry after acidifying with 2 ml of 1N phosphoric acid.

D, E, and F splits (polycarbonate filters): At Skidmore College, polycarbonate filters were re-dried and weighed daily on a microbalance until a constant mass (±0.005 mg) was obtained on consecutive days. Filter tare weights were subtracted and net mass accumulation was calculated. To determine bSi content, filters were extracted in 0.2 N NaOH for 2 hours at 95°C and then neutralized with 1 N HCl. Subsamples were taken for immediate analysis for dissolved silicate following standard spectrophotometric methods (Strickland and Parsons, 1972).

Epoch 3, NBST-302 and NBST-303 (Ag filters): ^{234}Th analysis was conducted onboard the *R/V Sally Ride* (see section 3.B). Final background counts to measure non-^{234}Th related β emissions were obtained at WHOI after six ^{234}Th half-lives had elapsed. Following ^{234}Th analysis, Ag filters were unmounted, re-dried, and gravimetrically subdivided into three equal sections. One ⅓

section was analyzed for PC and PN after high-temperature combustion on a Thermo Electron FlashEA 1112 C/N analyzer at the WHOI Nutrient Analytical Facility. One ⅓ section was analyzed for PIC via coulometry after acidifying with 2 ml of 1N phosphoric acid. The remaining filter section was analyzed for bSi at WHOI (Table 2).

D. Analytical and process blanks

Blank values for unused filters were obtained for PC, PIC, PN (Table 3), and bSi (Table 4). Filter blanks were obtained for each batch of bSi analyses and subtracted from those samples analyzed in the same batch (Table 5). QMA and Ag filter blanks were below the detection limit for PC and PN.

Prior to each group of NBST deployments, sets of sediment trap tubes were prepared as if for deployment, but were instead held in the shipboard laboratory for the duration of the deployment. For all epochs, two sediment trap tubes were filled with filtered surface seawater and 500 mL of formalin-poisoned brine (70 ppt) was gravity-fed through tubing to form a layer below the filtered seawater. For Epochs 2 and 3, two additional sediment trap tubes were prepared with 500 mL of formalin-poisoned brine (70 ppt) and no overlying filtered seawater to control for possible elevated blanks from the filtered seawater (which was likely to have rapidly mixed out of deployed traps during sample collection). The tubes were then processed and analyzed in parallel with the deployed tubes to provide a process blank determination (Table 6).

III. Data processing

A. PC and PN fluxes

Filter blanks were below the detection limit for PC and PN. Raw PC and PN contents of the filter sections were normalized by the fraction of the filter analyzed (Table 2). For NBST-302 and NBST-303 samples on Ag filters from Epoch 3, the >335-µm and <335-µm fractions for each tube were summed (splits A and B from the first tube were summed, and splits C and D from the second tube were summed). The mean PC and PN contents of the process blanks without overlying seawater from Epochs 2 and 3, normalized to one whole filter, were subtracted (Table 6). Blank-corrected values were normalized by the collection area, deployment length, and number of wet splits to yield flux. Uncertainties are propagated from the filter section weighing uncertainty and the standard deviation of the replicate process blank values.

B. PIC flux

The mean PIC content of the filter blank was subtracted from the PIC content of each filter section analyzed (Table 3). The PIC content was normalized by the fraction of the filter analyzed (Table 2). For NBST-302 and NBST-303 samples on Ag filters from Epoch 3, the >335-µm and

<335-µm fractions for each tube were summed (splits A and B from the first tube were summed, and splits C and D from the second tube were summed). The mean PIC content of the process blanks without overlying seawater, normalized to one whole filter, was subtracted (Table 6). Blank-corrected values were normalized by the collection area, deployment length, and number of wet splits to yield flux. Uncertainties are propagated from the weighing uncertainty, the standard deviation of the filter blank, and the standard deviation of the replicate process blank values.

C. POC flux

POC flux was determined as the difference between PC flux and PIC flux. POC flux uncertainties are propagated from PC flux uncertainty and PIC flux uncertainty.

D. P flux

The mean P content of the process blanks without overlying seawater was subtracted (Table 6). Blank-corrected values were normalized by the fraction of the filter analyzed (Table 2), collection area, deployment length, and number of wet splits to yield flux. Uncertainties are propagated from the weighing uncertainty and the standard deviation of the replicate process blank values.

E. Ba flux

The mean Ba content of the process blanks without overlying seawater was subtracted (Table 6). Blank-corrected values were normalized by the fraction of the filter analyzed (Table 2), collection area, deployment length, and number of wet splits to yield flux. Uncertainties are propagated from the weighing uncertainty and the standard deviation of the replicate process blank values.

F. bSi flux

The bSi content of the filter blank was subtracted from the bSi content of each filter section analyzed (Tables 4 and 5). For NBST-302 and NBST-303 samples on Ag filters from Epoch 3, the >335-µm and <335-µm fractions for each tube were summed (splits A and B from the first tube were summed, and splits C and D from the second tube were summed). The mean bSi content of the process blanks with overlying seawater was subtracted (Table 6). Blank-corrected values were normalized by the collection area, deployment length, and number of wet splits to yield flux. Uncertainties are propagated from the standard deviation of the process blank replicates.

G. mass flux

The mean tare weight of the filter was subtracted from the mean post-deployment filter weight. The mean mass of the process blanks without overlying seawater was subtracted (Table 6). Blank-corrected values were normalized by the collection area, deployment length, and number of wet splits to yield flux. Uncertainties are propagated from the standard deviations of the replicate tare weights and replicate post-deployment weights.

H. ^{234}Th flux

Process blanks are insignificant for ^{234}Th and were not subtracted (Table 6). For B and C splits and NBST-302 and NBST-303 samples from Epoch 3, the final background count rate was subtracted from the initial count rate to yield net count rate. Final background counts were not obtained for A splits, so the mean background count rate of B and C splits from epochs 1 and 2 (0.28 cpm) was subtracted. Net count rate was corrected for decay between time of collection and time of analysis. The result was corrected for detector efficiency to yield decay rate at time of collection. If a second count was performed for a sample, the decay rates from the two counts were averaged. Decay rates were normalized by the collection area, deployment length, and number of wet splits to yield flux. For NBST-302 and NBST-303 samples on Ag filters from Epoch 3, the >335-µm and <335-µm fractions for each tube were summed (splits A and B from the first tube were summed, and splits C and D from the second tube were summed). Uncertainties were propagated from the counting errors associated with the first (and second, if applicable) count and final background count.

I. Swimmer flagging procedure

Most of the sediment trap samples collected during the EXPORTS North Pacific field campaign contained a large number of “swimmers”, which are zooplankton that actively entered into the trap and then died upon entering the preservative brine within. The standard swimmer removal procedure is to pass the trap sample through a Nitex screen (in this case, 335 µm) to separate swimmers (most larger than this size) from passively sinking material. Then, the screen is picked under magnification to manually separate any large, passively sinking material from the retained swimmers. This material is returned to the <335-µm part of the sample prior to further processing.

During this campaign, the unusually high number of swimmers collected, including some smaller than the Nitex mesh size, meant that we could not successfully remove all the swimmer-derived material from the traps. Many of the reported trap fluxes therefore include a contribution from swimmers. Fluxes that are particularly suspect include total carbon, mass, particulate organic carbon (POC), particulate inorganic carbon, nitrogen, and phosphorus. On the other hand, fluxes of thorium-234, biogenic silica (bSi), and the cross-sectional area flux of

passively-sinking particles ("area") to the co-deployed polyacrylamide gel collector on each trap appear unaffected by swimmer contamination.

A Gaussian mixture cluster analysis procedure was used to identify the subset of samples with POC fluxes that are unlikely to be swimmer contaminated, as evidenced by high covariance among the following compositional ratios: bSi:POC, ^{234}Th:POC, area:POC, and mass:POC. Each sample was identified as "swimmer-contaminated" (swimmer flag = 1), probably uncontaminated (swimmer flag = 0), or unknown (swimmer flag = 2). Samples with flag values of 2 either were missing gel data, or had high relative uncertainty in bSi, ^{234}Th, mass, or POC.

IV. Additional information

Cautionary notes

Epoch 2, NBST-304 (195 m): The ~50 g descent weight became entangled in the package during deployment and did not separate as planned. NBST-304 failed to resurface after completing its mission, and began a second ~5-day collection cycle at the target depth. The ~50 g weight separated from the package during the second collection cycle, and NBST-304 resurfaced and was recovered. The trap tube lids closed as planned at the end of the first ~5-day cycle, and lids remained closed during the second cycle.

Epoch 3, NBST-302 and NBST-303: The trap tube lids closed as scheduled after the ~5-day collection period. Upon resurfacing, the NBSTs failed to download recovery mission instructions and descended for a second ~5-day cycle after a short time at the surface. The trap tube lids remained closed throughout the second cycle.

While the measurements from these samples appear to be consistent with analogous samples processed aboard the *R/V Revelle*, it is possible that some additional solubilization occurred during the prolonged interval between lid closure and recovery (Buesseler et al., 2007). The formaldehyde concentration in the brine (0.1%), sufficient to preserve against microbial decay for 3-5 days (Lamborg et al., 2008), has not been tested in samples held for 10 d.

Epoch 1, NBST-305 (330 m): Failure of the burn wire mechanism resulted in the sediment trap tubes remaining open until recovery.

Related datasets

Additional datasets were generated from these NBST deployments (Table 7).

References

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			Epoch 1				Epoch 2				Epoch 3				
Platform	Depth (m)	Split	PC/PN	PIC	Pb/Po	Ba/P	PC/PN	PIC	Pb/Po	Ba/P	PC/PN	PIC	bSi	Pb/Po	Ba/P
NBST020	95	A	0.23	0.27	0.50		0.27	0.26	0.47		0.24	0.27		0.48	
		B	0.52	0.48			0.51	0.49			0.32	0.34			0.33
		C	0.36	0.32		0.31	0.30	0.37		0.33	0.51	0.49			
NBST200	95	A	0.25	0.28	0.47		0.32	0.20	0.47		0.25	0.26		0.49	
		B	0.48	0.52			0.50	0.50			0.33	0.35			0.33
		C	0.30	0.35		0.36	0.34	0.31		0.35	0.52	0.48			
NBST302	195	A	0.26	0.26	0.48		0.23	0.29	0.48		0.33	0.34	0.34		
		B	0.49	0.51			0.31	0.32		0.37	0.32	0.34	0.35		
		C	0.33	0.30		0.37	0.52	0.48			0.32	0.38	0.30		
		D									0.32	0.35	0.34		
NBST303	145	A	0.51	0.49			0.25	0.27	0.48		0.32	0.36	0.32		
		B	0.27	0.25	0.48		0.34	0.33		0.33	0.33	0.32	0.34		
		C	0.29	0.33		0.38	0.48	0.52			0.35	0.31	0.34		
		D									0.37	0.34	0.29		
NBST304	195	A	0.28	0.26	0.46		0.27	0.23	0.50						
		B	0.35	0.34		0.31	0.34	0.34		0.31					
		C	0.48	0.52			0.50	0.50							
NBST305	330	A	0.26	0.25	0.49		0.27	0.23	0.50		0.25	0.29		0.46	
		B	0.53	0.47			0.30	0.37		0.34	0.33	0.35			0.32
		C	0.36	0.31		0.33	0.48	0.52			0.51	0.49			
blank brine only	na	A					0.26	0.25	0.49		0.31	0.23		0.46	
		B					0.33	0.33		0.34	0.35	0.34			0.31
		C					0.51	0.49			0.49	0.51			
blank brine + filtered sw	na	A	0.25	0.24	0.51		0.25	0.25	0.50		0.29	0.23		0.48	
		B	0.55	0.45			0.31	0.34		0.35	0.33	0.36			0.31
		C	0.34	0.36		0.30	0.51	0.49			0.49	0.51			

Table 2. Fraction of the QMA filter used for each analyte. For Epoch 3, NBST302 and NBST303 samples were filtered onto Ag filters.

	QMA split A		QMA splits B,C		Ag filter	
Replicate	C (µg)	fraction	C (µg)	fraction	C (µg)	fraction
1	2.65	0.25	2.78	0.50	3.21	0.33
2	2.83	0.25	2.71	0.50	3.07	0.33
3	2.75	0.25	2.69	0.50	3.2	0.33
4	3.01	0.25	2.87	0.50	2.96	0.33
5	2.82	0.25	2.89	0.50	2.89	0.33
6	2.85	0.25	-	-	-	-
mean	2.82		2.79		3.07	
s.d.	0.12		0.09		0.14	

Table 3. PIC content of unused pre-combusted QMA and Ag filters.

Replicate	Batch 1a	Batch 1b	Batch 1c	Batch 2	Batch 3	Ag filters
1	0.0462	0.0204	0.0306	0.0618	0.0300	-0.0154
2	0.0451	0.0251	0.0327	0.0766	-0.0385	-0.0147
3	-	-	-	-	-	-0.0122
4	-	-	-	-	-	-0.0122
5	-	-	-	-	-	0.0014
6	-	-	-	-	-	0.0179
7	-	-	-	-	-	0.0285
8	-	-	-	-	-	0.0285
9	-	-	-	-	-	0.0260
10	-	-	-	-	-	0.0253
mean	0.0457	0.0228	0.0317	0.0692	-0.0043	0.0073
s.d.	0.0008	0.0033	0.0015	0.0105	0.0484	0.0197

Table 4. bSi contents (µmol) of unused polycarbonate filters (batches 1-3) and Ag filters. Ag filter values are for a ⅓ filter section.

		Epoch 1		Epoch 2		Epoch 3	
Platform	Depth (m)	Split	Batch	Split	Batch	Split	Batch
NBST020	95	D	1b	D	1b	D	1c
		E	2	E	2	E	2
		F	3	F	3	F	3
NBST200	95	D	1c	D	1b	D	1c
		E	2	E	2	E	2
		F	3	F	3	F	3
NBST302	195	D	1c	D	1c	A	Ag
		E	2	E	2	B	Ag
		F	3	F	3	C	Ag
		-	-	-	-	D	Ag
NBST303	145	D	2	D	2	A	Ag
		E	3	E	3	B	Ag
		F	1a	F	1c	C	Ag
		-	-	-	-	D	Ag
NBST304	195	D	1b	D	1c	D	-
		E	2	E	2	E	-
		F	3	F	3	F	-
NBST305	330	D	2	D	1c	D	3
		E	3	E	2	E	1c
		F	1a	F	3	F	2
blank brine only	na	D	na	D	1c	D	1c
		E	na	E	2	E	2
		F	na	F	3	F	3
blank brine + filtered sw	na	D	2	D	1c	D	1c
		E	3	E	2	E	2
		F	1c	F	3	F	3

Table 5. Batch number of bSi analysis.

		QMA filters							Polycarbonate filters		
Epoch	Type	Split	C (µmol)	N (µmol)	PIC (µmol)	P (ng)	Ba (ng)	^{234}Th (dpm)	Split	mass (mg)	bSi (µmol)
1	brine + sw	A	10.417	0.514	0.048			0.18	D	0.280	0.044
		B	7.795	0.000	-0.016			0.13	E	0.198	0.003
		C	10.236	3.005	0.070	1056		0.10	F	nd	nd
2	brine + sw	A	4.867	0.000	0.024			0.06	D	0.077	0.042
		B	3.638	2.571	0.022	1015		0.18	E	0.067	-0.019
		C	3.340	0.395	0.004			0.19	F	0.082	0.048
3	brine + sw	A	8.222	0.534	0.051			0.84	D	0.100	0.034
		B	7.862	3.010	0.056	1158		0.22	E	0.163	0.046
		C	6.130	0.000	-0.029			0.41	F	0.261	-0.037
all	brine + sw	mean	6.945	1.114	0.026	1076		0.26	mean	0.153	0.020
		s.d.	2.622	1.334	0.034	74		0.24	s.d.	0.085	0.033
2	brine only	A	3.913	0.000	0.097			-0.10	D	0.064	0.050
		B	3.816	2.463	0.111	707	8.9	0.05	E	0.053	0.107
		C	2.864	0.513	0.039			0.15	F	0.067	0.018
3	brine only	A	1.567	0.000	0.033			-0.02	D	0.108	-0.020
		B	1.397	0.000	0.037	709	7.9	0.13	E	0.057	0.031
		C	0.395	0.000	-0.036			0.16	F	0.041	0.067
2,3	brine only	mean	2.325	0.496	0.047	708	8.4	0.06	mean	0.065	0.042
		s.d.	1.428	0.985	0.053	1	0.7	0.10	s.d.	0.023	0.044

Table 6. Process blank values.

Dataset	PI	Affiliation	Platform	Collector
Particulate ^{210}Po and ^{210}Pb	K. Buesseler	WHOI	NBST, STT	brine
Particulate Ti, trace element, and REE concentrations	P. Lam	UCSC	NBST, STT	brine
Stable isotopes, amino acids	H. Close	RSMAS	NBST, STT	brine
Lipidomic analysis of particles	B. Van Mooy	WHOI	NBST, STT	brine
Optical attenuance flux from transmissometer	M. Estapa	Skidmore	NBST	transmissometer
Optical attenuance flux from gel traps	M. Estapa	Skidmore	NBST, STT	polyacrylamide gel
Images of sinking particles	C. Durkin	Moss Landing	NBST, STT	polyacrylamide gel
Cell and zooplankton number fluxes	C. Durkin	Moss Landing	NBST, STT	polyacrylamide gel
Zooplankton product flux	C. Durkin	Moss Landing	NBST, STT	polyacrylamide gel
DNA sequencing	C. Durkin	Moss Landing	NBST, STT	RNA*later*
DNA sequencing	A. Santoro	UCSB	STT	RESPIRE trap (live)

Table 7. Additional datasets generated from NBST deployments.